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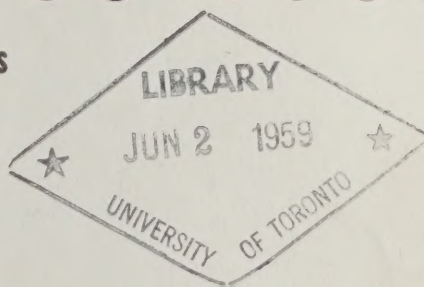
Canada. Agriculture, Dept of. Illustration
Station, Fort William, Ont



ILLUSTRATION STATION
FORT WILLIAM ONTARIO
AND ASSOCIATED STATIONS

PROGRESS REPORT 1953-1957

By J. K. Knights




CANADA DEPARTMENT OF AGRICULTURE

FOREWORD

This report was prepared by the late Mr. J. K. Knights before his death which occurred on March 8, 1958 at the age of fifty-seven.

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INTRODUCTION

Three Illustration Stations were operated in Northwestern Ontario during the 5 years 1953 to 1957, on the basis of a co-operative agreement between the owner and the Experimental Farms Service. The objective was to study farm production problems in the local environment for soil and climate. Some particulars regarding these Illustration Stations are as follows:

District	Location	Owner-Operator	Yr. Established	Yr. Terminated
Thunder Bay	Fort William	Campbell Hanna	1937	—
Rainy River	Fort Frances	Lowe Bros.	1951	—
Kenora	Oxdrift	J. Corner	1954	1956

Livestock production with emphasis on dairying is the chief enterprise throughout the area. Some poultry and a few hogs are kept, but no sheep. Cash crops include potatoes, clover seed and seed grain.

During the 5-year (1953-57) period covered by this report 2,135 persons attended 26 Field Days. In addition, the farming public in the Lakehead area were kept informed by an exhibit featuring various phases of the Illustration Stations program at the Canadian Lakehead Exhibition each year.

WEATHER RECORDS

The season for crop growth in Northwestern Ontario is relatively short. Cultivation of the land usually begins about May 1 and generally ceases about November 1. Killing frosts usually occur early in September. Under these conditions, cereals, forage crops, potatoes, and root crops can be grown successfully.

Standard rain gauges are located at all station farms to record precipitation. Table 1 shows the records through the years 1953-57 inclusive, in terms of total annual snowfall, rainfall, and total annual precipitation. Rainfall is fairly evenly distributed through the period from April to October. The data show precipitation at Fort William to be greater than at Fort Frances or Oxdrift.

Maximum and minimum temperatures are recorded daily at each location and are reported in Table 2. The general trend of temperature shows Fort William to have the shortest growing season; Fort Frances has a longer season and Oxdrift ranges between these two locations.

Table I. Precipitation Records 1953 - 1957

Location	Year	Total Annual Snowfall*	Total Annual Rainfall	Total Annual Precipitation
		in.	in.	in.
Fort William	1953	78.7	18.46	26.33
	1954	106.2	17.54	28.16
	1955	144.2	20.50	34.92
	1956	162.6	17.08	33.34
	1957	43.0	19.11	23.41
	Average 15 yrs. (1943-57)	93.0	21.42	30.72
Fort Frances	1953	51.5	20.20	25.35
	1954	69.7	15.11	22.08
	1955	107.0	23.49	34.19
	1956	66.5	13.52	20.17
	1957	43.5	21.36	25.71
	Average 6 yrs. (1952-57)	63.4	18.34	24.68
Oxdrift	1954	91.0	15.73	24.83
	1955	112.0	20.24	31.44
	1956	78.0	17.20	25.00
	Average (1954-56)	93.7	17.20	26.57

*Ten inches of snow is considered to be equal to one inch of precipitation.

Table II. Frost Records

Location	Year	Frost-Free Period	Killing Frost-Free Period*
		days	days
Fort William	1953	90	139
	1954	73	108
	1955	86	113
	1956	99	99
	1957	97	106
	Av. 17 yrs. (1941-57)	83.5	112
Fort Frances	1953	126	149
	1954	119	131
	1955	117	117
	1956	99	117
	1957	123	156
	Av. 6 yrs. (1952-57)	117	133
Oxdrift	1954	106	119
	1955	105	133
	1956	100	110
	Av. 3 yrs. (1954-56)	104	121

*28°Fahrenheit or lower

Lowest Temperature on record:	Fort William	-46°F (1950)
	Fort Frances	-40°F (1954)
	Oxdrift	-38°F (1954, 1955)
Highest Temperature on record:	Fort William	97°F (1941,45,47,55)
	Fort Frances	97°F (1954)
	Oxdrift	97°F (1955,56)

CROP MANAGEMENT STUDIES

Chemical Fertilizers, Limestone, and Manure in a Four-Year Rotation of Hoed Crops (Potatoes or Turnips), Grain, Hay, Hay

A rotation of hoed crops (potatoes or turnips), grain, hay, and has has been tested on a clay loam soil at Fort William for 14 years. Fertilizers were applied every 4 years with the hoed crop and repeated in the same location at the beginning of each new 4-year cropping cycle. Manure was ploughed down in the autumn and chemical fertilizer applied broadcast in the spring prior to planting the hoed crop. Table 4 on page 5 gives the 14-year average yields for crops under the 4-year cropping sequence. Each treatment resulted in increased yields over the check.

Table 3 shows the relationship between the length of the growing season, precipitation and crop yields at Fort William. The standard deviation is employed as a measure of the variability of individual observations from the mean value. Approximately two thirds of the total observations occur in the range of the mean plus or minus one standard deviation.

Table III. Relationship of the Length of Growing Season and Precipitation to the Yield of Farm Crops in a Four-Year Rotation (Hoed Crops, Grain, Hay, Hay)

Year	Length of Season (above 28° F.)	Precipitation		Av. Yield per Acre			
		April-June	July-Sept.	Oats	Hay	Potatoes	Turnips
	days	in.	in.	bu.	tons	bu.	tons
1950	129	13.96	10.17	42.0	1.70	115.0	16.5
1951	117	8.01	12.07	53.0	1.60	200.0	14.0
1952	100	6.82	9.03	56.0	1.39	104.0	12.0
1953	139	9.34	7.14	61.0	1.58	135.0	11.0
1954	108	10.81	5.58	60.0	2.80	220.0	10.0
1955	113	4.63	10.37	47.0	1.61	160.0	11.0
1956	99	7.84	8.58	51.0	1.44	130.0	12.0
1957	106	6.32	7.62	62.0	1.43	125.0	16.0
Average	113.9	8.47	8.82	54.0	1.69	148.6	12.8
Standard Deviation	14.0	2.91	2.06	7.1	0.46	41.5	2.4

Table IV. Fertilizer Test at Fort William on a Four-Year Rotation of Hoed Crops, Grain, Hay, Hay

Treatment per Acre	Average Yields per Acre							
	Potatoes		Turnips		Wheat		Barley	
	bu.	tons	bu.	tons	bu.	tons	bu.	tons
Check	149.6	11.12	31.3	29.8	31.7	1.95	2.33	1.58
16 tons — manure	288.4	19.36	45.9	42.0	41.6	3.41	4.29	2.82
16 tons — manure + 500 lb. 20% superphosphate	356.6	25.33	51.8	49.1	46.5	3.78	4.98	3.89
16 tons — manure + 500 lb. 20% superphosphate + 2 tons limestone	323.6	24.57	50.7	48.1	46.9	3.75	4.74	4.64
16 tons — manure + 2 tons limestone	287.8	20.19	47.4	37.0	42.8	3.52	4.48	3.21
1000 lb. 4-8-10 (sulphate of potash)	276.3	21.80	45.0	41.6	42.8	3.01	3.80	2.67
1000 lb. 4-8-10 (muriate of potash)	247.3	23.49	44.6	40.3	46.8	2.81	3.63	2.50
500 lb. 4-8-10 (muriate of potash)	191.9	22.42	38.4	34.7	40.5	2.43	3.12	2.19
250 lb. 4-8-10 (muriate of potash)	168.4	17.92	33.1	31.3	37.3	2.22	2.75	1.74
500 lb. 20% superphosphate + 200 lb. sulphate of Ammonia	170.6	19.81	30.7	34.5	42.0	2.29	3.14	2.14
500 lb. 20% superphosphate	172.2	18.68	32.7	34.8	41.8	2.41	3.29	2.34
								2.56

FORAGE CROPS

Mixtures for Seeding Hay Crops

During the 3-year period 1956-1958, 14 grass — legume hay mixtures have been under study on the Fort William Substation. On the basis of average yield data, as set forth in Table 5, there is a significant difference between mixture performance for the period. Results clearly indicate the importance of selecting mixtures containing either brome or timothy with alfalfa. While the clover varieties ladino, alsike and red clover contributed substantially to total production in the first year, winter killing and competition with alfalfa reduced their effectiveness in the second and third years of this study.

Mixtures for Hay Production

The results in Table 6 show the production of timothy, alsike and ladino clover in combination with several varieties of alfalfa. There is no significant difference in yields of mixtures for the 1954-56 period at Fort William.

**Table V. Mixtures for Seeding Hay Crops
Fort William**

(#) Mixtures and Rates in Pounds per Acre	Av. Yield 1956-58 Tons/Ac. Dry Wt.
1. 24# Mixture of (Timothy 8; red clover 3; alfalfa 3; alsike 2)	3.32
2. 8# Timothy; 2# alsike; 6# alfalfa	3.13
3. 16# Brome; 2# ladino; 5# alfalfa	3.13
4. 8# Timothy; 8# alfalfa	3.03
5. 16# Brome; 8# alfalfa	2.99
6. 16# Alfalfa (Grimm)	2.99
7. 8# Mixture of (Timothy 8; red clover 3; alfalfa 3; alsike 2)	2.84
8. 8# Timothy; 2# alsike; 3# red clover; 3# alfalfa	2.75
9. 16# Alfalfa (Ladak)	2.72
10. 8# Timothy; 6# red clover; 2# ladino	2.06
11. 8# Brome; 5# timothy; 5# red clover; 2# alsike	1.99
12. 8# Timothy; 6# red clover; 2# alsike	1.87
13. 5# Timothy; 6# red clover; 5# orchard; 2# alsike	1.86
14. 8# Timothy; 8# red clover	1.84
L. S. D. $P = 0.05$	0.29

**Table VI. Mixtures for Hay Production
Fort William, 1954-56**

(#) Mixture and Rates in Pounds per Acre	Ave. Yield per Acre in Tons of Dry Weight
#16 Timothy 50%; Rhizoma 50%	2.82
#16 Timothy 50%; Cossack 50%	2.65
#16 Timothy 50%; Grimm Alfalfa 50%	2.54
# 8 Timothy 50%; Rhizoma 50%	2.54
#16 Timothy 50%; Ladak Alfalfa 50%	2.49
# 8 Timothy 50%; Cossack 50%	2.43
# 8 Timothy 50%; Ladak Alfalfa	2.39
# 8 Timothy 50%; Grimm Alfalfa	2.37
#16 Timothy 50%; R.Cl. 18¾%; Alfalfa 18¾%; Alsike 12½%	2.36
#16 Brome 70%; Alfalfa 20%; Ladino 10%	2.34
#16 Timothy 50%; Ranger 50%	2.22
# 8 Timothy 50%; R.Cl. 18¾%; Alfalfa 18¾%; Alsike 12½%	2.20
# 8 Timothy 50%; Ranger 50%	2.11
# 8 Brome 70%; Alfalfa 20%; Ladino 10%	1.98

CEREAL STUDIES

Cereal variety tests of wheat, barley and oats were conducted at Fort William. Data outlining the performance of varieties in these tests are outlined in Tables 7, 8 and 9.

**Table VII. Spring Wheat Variety Test
Fort William, 1953-56**

Variety	Average Yield per Acre	Maturity	Straw		Rust	
			Length	Lodging*	Leaf	Stem
	bu.	days	in.	1-9	%	%
Selkirk	48.0	103	33	1.7	6	Trace
Lee	46.0	104	33	2.6	21	9.5
Regent	41.4	104	34	2.2	49	5.0
Redman	43.5	101	33	1.7	40	7.5
Acadia	39.5	102	33	2.1	53	16.0
Cascade	35.9	106	39	2.6	35	12.0

*Lodging scale: 1 erect, 9 flat on the ground.

**Table VIII. Barley Variety Test
Fort William, 1953-57**

Variety	Yield per Acre	Weight per Bushel	Maturity	Straw	
				Length	Lodging*
	bu.	lb.	days	in.	1-9
<u>Five-Year Average 1953-57</u>					
Brant	85.7	47.2	95	30	4.7
Nord	83.7	49.0	89	32	2.7
Montcalm	77.6	48.8	95	36	4.5
<u>Three-Year Average 1955-57</u>					
Nord	84.3	48.5	90	31	2.3
Brant	83.9	46.8	95	29	5.7
Herto	83.3	52.0	101	30	4.2
Husky	81.9	49.5	95	31	3.1
Montcalm	77.4	38.5	94	34	5.4
<u>Two-Year Average 1956-57</u>					
Parkland	89.4	49.5	97	36	3.5
Nord	86.0	47.7	91	33	3.3
Herto	85.3	52.5	105	32	3.1
Brant	83.2	46.2	98	31	5.7
Montcalm	76.6	48.0	97	37	4.9

*Lodging scale: 1 erect, 9 flat on ground.

**Table IX. Oat Varieties
Fort William, 1953-57**

Variety	Yield per Acre	Weight per Bushel	Per Cent Hull	Maturity	Straw		Per Cent Rust	
					Length	Lodging*	Leaf	Stem
	bu.	lb.	%	days	in.	1-9	%	%
<u>Five-Year Average 1953-57</u>								
Rodney	116.3	35.4	27.2	104	36	2.7	T	T
Garry	112.5	35.2	26.4	101	36	1.6	T	T
Ajax	108.3	33.7	28.0	97	36	2.8	3.0	T
Beaver	103.3	34.0	24.8	98	36	2.9	2.2	T
<u>Four-Year Average 1953-56</u>								
Rodney	117.2	35.6	27.0	103	36	2.8	T	T
Simcoe	113.2	33.7	25.4	97	37	2.7	1.0	T
Garry	112.8	35.5	25.8	100	36	1.6	T	T
Ajax	109.0	34.0	26.2	96	36	2.9	3.0	T
Vanguard	104.9	32.5	24.5	100	35	2.6	T	T
Beaver	103.3	34.0	24.8	98	36	2.9	2.2	T
<u>Four-Year Average 1954-57</u>								
Shield	101.1	33.7	24.9	94	33	2.7	1.0	T

T indicates a trace of rust

*1 erect, 9 flat on ground.

POTATO STUDIES

Variety Tests

During the 5 years, 1953-57, potato varieties were grown at Fort William. Marketable yields, total yields, and per cent total solids are given in Table 10. The standard variety for the test was Keswick. Ontario, a late variety, was the only one which outyielded Keswick.

**Table X. Potato Variety Test
Fort William 1953-57**

Variety	Yield per acre			Solids	Maturity
	Total	Marketable	Relative*		
	bu.	bu.	%	%	
<u>Average 1953-57</u>					
Keswick	523	501	100.0	19.4	Medium
Cherokee	526	482	96.2	19.6	Late
Pontiac	512	476	95.0	17.7	Late
Manata	501	458	91.4	19.2	Medium late
Green Mountain	496	451	90.0	20.8	Late
Kennebec	451	425	84.8	19.6	Medium late
Early Gem	436	415	82.8	17.1	Early
<u>Average 1954-56</u>					
Ontario	603	575	109.1	18.3	Late
Keswick	551	527	100.0	19.7	Medium
Manata	562	521	98.9	18.7	Medium late
Cherokee	555	510	96.8	19.4	Late
Pontiac	517	481	91.3	17.2	Late
Green Mountain	520	472	89.6	20.4	Late
Early Gem	477	464	88.0	16.7	Early
Canso	491	454	86.1	19.3	Late
Kennebec	474	447	84.8	19.5	Late
Waseca	479	442	83.9	16.9	Late
<u>Average 1956-57</u>					
Keswick	553	527	100.0	19.3	Medium
Kennebec	528	503	95.4	19.4	Medium late
Pontiac	526	487	92.4	17.6	Late
Huron	604	483	91.6	19.0	Late
Manata	538	479	90.9	18.6	Medium late
Red Kate	524	479	90.9	18.6	Late
Cherokee	520	464	88.0	18.6	Late
Green Mountain	465	440	83.5	20.0	Late
Osage	422	400	75.9	17.1	Late
Waseca	423	386	73.2	17.4	Late
Early Gem	375	334	63.4	17.1	Early

*Yields expressed in Relation to the Standard, Keswick.

Fertility Studies

Investigations have been conducted since 1953 to study the effect of chemical fertilizer at various rates on the production of potatoes at Fort William. In 1955 two higher rates were added to test the maximum response. The yield results are outlined in Table 11.

**Table XI. Effects of Applications of Fertilizers to Potatoes
Fort William 1953-57**

Fertilizer	Rate per Acre	Yield per Acre
	lb.	bu.
		<u>Average 1953-57</u>
Check	0	199.4
2-16-6	300	263.9
2-16-6	800	342.1
4-24-12	800	406.5
2-16-6	1300	384.9
2-16-6	1800	396.1
2-16-6	2300	463.0
Average		350.8
		<u>Average 1956-57</u>
Check	0	193.8
2-16-6	2800	421.4
2-16-6	3300	433.5
Average		349.6

LAND USE AND PRODUCTION

The forms of land use on the three Illustration Stations during the 5-year period 1953-57 are given in Table 12. As an average for the three farms, the greatest proportion of the cropland was in hay or silage, 77 acres per farm or 38.5 per cent. Cereals accounted for 51.4 acres per farm or 25.7 per cent of the cropland, and improved pasture 43.9 acres per farm, or 21.9 per cent of the cropland.

Table XII. Utilization of Land on Illustration Stations
Fort William, 1953-57

Land Use	Fort William	Fort Frances	Oxdrift*	Per Cent of Total
Total area in farm	260	527	198	100.0
Cropland including improved pasture	197	297	106	75.8
Native pasture, bush, lanes, farmstead	63	230	92	24.2
				Per Cent of Cropland
Potatoes	8.5	4.0	—	2.0
Turnips	2.4	0.3	—	0.5
Cereals	46.5	75.2	32.5	25.7
Hay & Silage	78.2	107.8	45.0	38.5
Pasture in farm rotation	20.4	9.0	6.5	6.0
Improved permanent pasture	41.0	70.7	20.0	21.9
Fallow	—	14.0	1.0	2.5
Forage seeds & miscellaneous	—	16.0	1.0	2.9

*1954-1957 only

FARM BUSINESS STUDY

Average capital investment in land, buildings, livestock and equipment on these three Station farms during the 5-year period amounted to \$34,455, or \$178 per acre of cropland. The investment per acre of cropland ranged from a low of \$148 to a high of \$213. Distribution of the farm capital for the three farms was 21.3 per cent in land, 25.4 per cent in buildings, 20.6 per cent in livestock and 32.7 per cent in equipment.

Cattle and dairy products were the most important sources of farm revenues. At Fort William, dairying accounted for 65.4 per cent of the farm revenue; at Fort Frances, beef cattle contributed 79.2 per cent; dairying amounted to 62.0 per cent at Oxdrift. Poultry income was relatively important at two locations; 15.8 per cent at Fort William and 14.8 per cent at Oxdrift.

